ALL GODS CHILDREN (PWS 3230059)
SOURCE WATER ASSESSMENT FINAL REPORT

October 13, 2000

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of this designated assessment area, sensitivity factors associated with the wells, and aquifer characteristics.

This report, *Source Water Assessment for All Gods Children in Emmett, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The All Gods Children drinking water system consists of one well. Though no existing ground water problems are currently identifiable, a lack of well construction information causes the All Gods Children well to be rated higher then it may actually be. The susceptibility analysis run on the All Gods Children well shows a high potential for inorganic compounds, synthetic organic compounds, and volatile organic compounds. The zone of water contribution, or capture zone, intersects a Group 1 priority area for the synthetic organic compounds pesticides Alachlor and Atrazine. Volatile organic compounds and synthetic organic compounds may also be contributed from petroleum and diesel fuel stored in underground storage tanks at closed gas stations and by a concrete contractor. The major source for inorganic compounds is leaching from irrigated agricultural land.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the All Gods Children system source water protection activities should focus, first, on improving the wellhead protection strategy. No data was available to indicate whether a Sanitary Survey had been completed. If such a survey showed compliance with the wellhead and surface seal standards as well as the protection from surface flooding, then the potential rating for the well would decrease from High to Moderate for inorganic compounds and volatile organic compounds. As most of the designated source water areas are outside the jurisdiction of All Gods Children, the system should establish partnerships with state and local agencies and industry groups, which can be critical to a successful protection strategy. Additional activities should focus on implementation of practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the designated source water areas. Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Source water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the Gem Soil and Water Conservation District, and the Natural Resources Conservation Service.

A community with a fully developed source water protection program will incorporate many strategies. For assistance in developing protection strategies please contact the Boise Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR ALL GODS CHILDREN, EMMETT, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings used to develop this assessment is also attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess the over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

All Gods Children has a single non-community non-transient well servicing approximately 60 people with two connections. It is located north of Emmett, Idaho, near the corner of N. Washington Avenue and W. Idaho Blvd. (Figure 1).

The primary water quality issue currently facing All Gods Children is the unknown condition of the wellhead. If the system construction does not meet standards stipulated in a sanitary survey, then the well will be more susceptible to inorganic compounds (IOC), volatile organic compounds (VOC), and synthetic organic compounds (SOC) and the problems associated with managing this contamination.

Defining the Zones of Contribution - Delineation

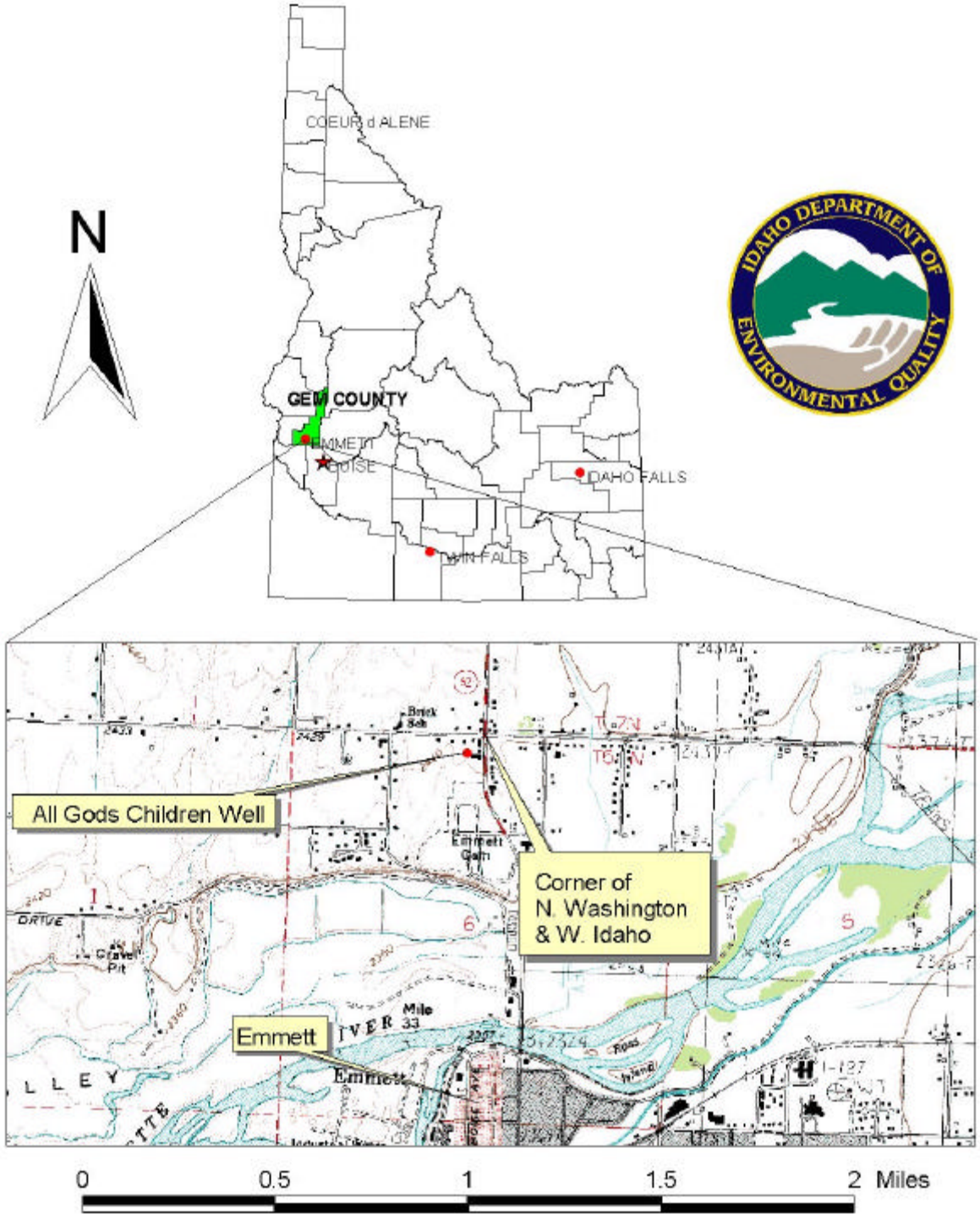
The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time of travel zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ used a refined computer model developed by EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) time-of-travel (TOT) for water associated with the Payette Valley aquifer in the vicinity of All Gods Children, Emmett, Idaho. The computer model used site specific data, assimilated by DEQ from a variety of sources including the City of Emmett and other local well logs. The delineated source water assessment area for All Gods Children can best be described as a corridor about ¼ mile wide and 2 miles long that extends to the north-northeast ending at the North Side Main Canyon Canal. The actual data used by DEQ in determining the source water assessment delineation areas are available upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

The dominant land use outside All Gods Children is irrigated agriculture with residential subdivisions and small businesses.

Figure 1. Geographic Location of All Gods Children Well



It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted during May of 2000. The first phase involved identifying and documenting potential contaminant sources within the All Gods Children Source Water Assessment Area through the use of computer databases and Geographic Information System maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to validate the sources identified in phase one and to add any additional potential sources in the area. This task was undertaken with the assistance of Selena Walker Clegg Investment.

A total of four potential contaminant sites with six potential contaminant sources are located within the delineated source water areas (Table 1). Most of the potential contaminant sources within delineated source water areas are located at the corner of North Washington Avenue and West Idaho Blvd. Potential contaminant sources located in the delineated source water area include two closed gas stations with two underground storage tanks and with incomplete leaking underground storage tank (LUST) cleanups, a home manufacturing business, and a concrete contractor (Figure 2).

Contaminants of concern are primarily related to diesel and petroleum products associated with gas stations and manufacturing. Additional concerns are related to the organic priority area for the SOC pesticides Atrazine and Alachlor associated with the irrigated agriculture land use of the area. Table 1 lists the potential contaminants of concern, time of travel zones, and information source.

Figure 2. All Gods Children Well Delineation Map and Potential Contaminant Source Locations

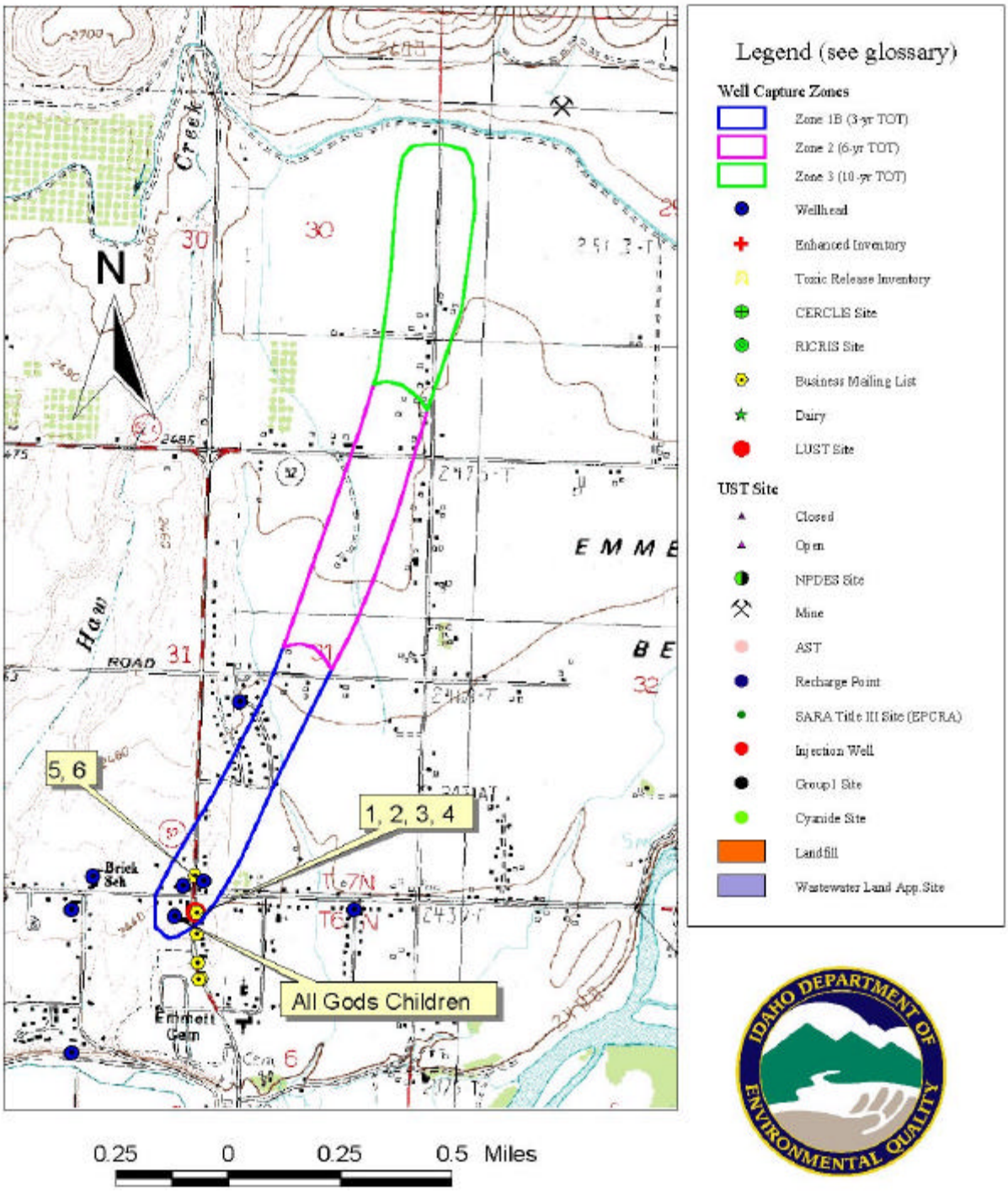


Table 1. All Gods Children, Potential Contaminant Inventory

SITE #	Source Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
1	LUST	0-3	Database Search	VOC, SOC
2	LUST	0-3	Database Search	VOC, SOC
3	UST	0-3	Database Search	VOC, SOC
4	UST	0-3	Database Search	VOC, SOC
5	Concrete contractors	0-3	Database Search	VOC, SOC
6	Home manufacturing	0-3	Database Search	VOC, SOC, IOC

[1] UST = underground storage tank, LUST = leaking underground storage tank
[2] TOT = time of travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Section 3. Susceptibility Analysis

The water system's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

Hydrologic sensitivity was moderate for the All Gods Children well (see Table 2). This reflects the shallow nature of the upper, unconfined ground water system, and the vadose zone (zone from land surface to the water table) composed mainly of gravel. Though there is not a low permeability zone to slow contaminant movement, the soils are classified in the poor to moderate drainage class, which can retard the vertical transport of contaminants.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. The All Gods Children drinking water system consists of one well that extracts ground water for domestic uses. The well system construction score showed high sensitivity because of the lack of well log or sanitary survey information.

Since there is no well log for All Gods Children, certain assumptions were made in the study. The well is assumed to have been completed in the shallow unconfined sand and gravel aquifer above a deeper blue clay layer. As a non-community non-transient well, the upper 100 feet should be sufficient to supply their needs, so the assumption of an unconfined system is likely valid.

Potential Contaminant Source and Land Use

The All Gods Children well rated in the high category for SOCs, and in the moderate category for VOCs and for IOCs. It rated as low for microbial contaminants. Agricultural chemical sources and irrigated agricultural land use in the delineated source area for the well contributed the largest numbers of points for the inorganic category. An equal number of points for the SOC category came from agriculture and diesel sources. The majority of the VOC points came from the petroleum and solvent sources.

The Group 1 organic priority area for the pesticides atrazine and alachlor was identified because at least 25% of the local area wells have detections above a certain level. Since the All Gods Children well is located in this area, the likelihood of SOC impacts from agricultural activity increases.

Final Susceptibility Ranking

A detection above a drinking water standard MCL or a detection of total coliform bacteria or fecal coliform bacteria will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. In terms of the total susceptibility score, it can be seen from Table 2 that the All Gods Children well showed a high susceptibility for SOCs, VOCs, and IOCs. The well was rated as moderate for microbial contaminants.

Table 2. Summary of All Gods Children Susceptibility Evaluation

Well	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
1(Outside)	M	M	M	M	L	H	H	H	H	M

[1]**H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility**
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Susceptibility Summary

The lack of construction information concerning the All Gods Children well makes conclusions highly tentative. The high system construction score is of major concern. There are also multiple potential sources of SOCs that can impact the well.

The All Gods Children well is assumed to take its water in whole from the shallow, unconfined alluvial (river deposited) aquifer. The shallow aquifer contains much higher levels of nitrate, lower levels of iron, and higher levels of arsenic than the deeper aquifer. Water yields from the shallow aquifer are significantly higher than from the deeper aquifer. Ground water in the shallow aquifer is recharged primarily from surface water irrigation, direct precipitation, and canal leakage.

Section 4. Options for Source Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective source water protection program is tailored to the particular local source water protection area. A community with a fully-developed source water protection program will incorporate many strategies. For the All Gods Children system, source water protection activities should focus, first, on obtaining information as to whether a sanitary survey has been conducted on the well. An effort should be made to guarantee that the wellhead and surface seal are adequately maintained and that the well is protected from surface flooding. Completion of these tasks will reduce the IOC and VOC susceptibilities from high to moderate. As most of the designated source water areas are outside the jurisdiction of the All Gods Children system, the facility should establish partnerships with state and local agencies and industry groups, which can be critical to a successful protection strategy. Additional activities should focus on implementation of practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the designated source water areas. Due to the time involved with the movement of ground water, wellhead protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Source water protection activities for agriculture should be coordinated with the Idaho Department of Agriculture, the Soil Conservation Commission, the Gem Soil and Water Conservation District, and the Natural Resources Conservation Service.

Assistance

Public water suppliers and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Boise Regional DEQ Office (208) 373-0550

State DEQ Office (208) 373-0502

Website: http://www2.state.id.us/deq

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at 1-800-962-3257 for assistance with wellhead protection strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund@ is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997. "Recommended Standards for Water Works."

Idaho State Department of Agriculture, 1998. Unpublished Data.

Idaho Division of Environmental Quality, 1994. Ground Water and Soils Reconnaissance of the Lower Payette Area, Payette County, Idaho. Ground Water Quality Technical Report No. 5. Idaho Division of Environmental Quality. December 1994.

Idaho Division of Environmental Quality, 1996. Lower Payette River Agriculture Irrigation Water Return Study and Ground Water Evaluation, Payette County, Idaho. Water Quality Status Report No. 115.

Idaho Department of Environmental Quality, 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Environmental Quality, 2000. City of Fruitland Wellhead Viability Project 319 Grant Final Report July 2000.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Natural Resources Conservation Service, 1991. Idaho Snake-Payette Rivers Hydrologic Unit Plan of Work. March 1991.

United States Geological Survey, 1986. Quality of Ground Water in the Payette River Basin, Idaho. United States Geological Survey. Water Resources Investigation Report 86-4013.

University of Idaho. 1986. Ground Water Resources in a Portion of Payette County, Idaho. Idaho Water Resources Research Institute. University of Idaho. Moscow, Idaho. April 1986.

Attachment A

All Gods Children Susceptibility Analysis Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report Public Water System Name : ALL GODS CHILDREN Well# : WELL 1

Public Water System Number 3230059 10/13/2000 9:58:33 AM

1. System Construction		SCORE
Drill Date		
Driller Log Available	NO	
Sanitary Survey (if yes, indicate date of last survey)	NO	0
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	NO	1
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	NO	1
Total System Construction Score		6

2. Hydrologic Sensitivity		
Soils are poorly to moderately drained	YES	0
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
Total Hydrologic Score		4

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2

Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	1	6	6	0
(Score = # Sources X 2) 8 Points Maximum		2	8	8	0
Sources of Class II or III leacheable contaminants or	YES	4	0	0	
4 Points Maximum		4	0	0	
Zone 1B contains or intercepts a Group 1 Area	YES	0	0	2	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		10	12	14	4

Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or	YES	1	0	0	
Land Use Zone II	Greater Than 50% Irrigated Agricultural Land	2	2	2	
Potential Contaminant Source / Land Use Score - Zone II		3	2	2	0

Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or	YES	1	0	0	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		2	1	1	0

Cumulative Potential Contaminant / Land Use Score	17	17	19	6
4. Final Susceptibility Source Score	13	13	14	12
5. Final Well Ranking	High	High	High	Moderate